

**CLAIMS**

What is claimed is:

1. A network device for routing a mobile IP packet, comprising:  
a control plane processor;  
a forwarding plane processor coupled to the control plane processor; and  
a fastpath processor coupled to the forwarding plane processor and the control plane processor, the fastpath processor capable of receiving the mobile IP packet, looking up a binding cache maintained by the Forwarding Plane Processor to determine if an entry exists for the mobile IP packet, and forwarding the mobile IP packet to a destination corresponding to the entry in the binding cache.
2. The network device according to Claim 1 wherein the fastpath processor is further capable of encapsulating the mobile IP packet prior to forwarding the mobile IP packet to the destination.
3. The network device according to Claim 1 wherein the forwarding plane processor and the fastpath processor comprise a single processor.
4. The network device according to Claim 1 wherein the fastpath processor is additionally capable of routing the mobile IP packet to the forwarding plane processor if the entry for the mobile IP packet does not exist in the binding cache.
5. The network device according to Claim 2 wherein the forwarding plane processor is capable of routing the mobile IP packet to the control plane processor.
6. The network device according to Claim 4 wherein the control plane processor is capable of verifying the mobile IP packet.

7. The network device according to Claim 5 wherein the control plane processor is further capable of issuing a command to the Forwarding Plane Processor to add the entry for the mobile IP packet into the binding cache.
8. The network device according to Claim 1 wherein the mobile IP packet is encapsulated and the entry in the binding cache corresponds to a destination specified by an inner portion of the mobile IP packet.
9. The network device according to Claim 8 wherein the fastpath processor is further capable of decapsulating the mobile IP packet and forwarding the mobile IP packet to the destination.
10. The network device according to Claim 9 wherein the fastpath processor is further capable of encapsulating the mobile IP packet prior to forwarding the mobile IP packet to the destination.
11. The network device according to Claim 6 wherein the control plane processor is further capable of at least one of:
  - adding entries to a copy of the binding cache;
  - deleting entries from the copy of the binding cache;
  - instructing the forwarding plane processor to perform at least one of adding and deleting binding entries from the binding cache;
  - initiating and aborting proxy neighbor advertisements in response to additions to and deletions from the binding cache,
  - performing security functions;
  - performing discovery functions; and
  - performing management functions.
12. The network device according to Claim 5 wherein the forwarding plane processor is further capable of at least one of:
  - monitoring an interface between the forwarding plane processor and the control plane processor;

responding to activate neighbor proxy advertisement and deactivate neighbor proxy advertisement calls; and  
maintaining the binding cache by responding to instructions from the control plane processor to  
add bindings to the binding cache,  
delete bindings in the binding cache,  
purge bindings in the binding cache, and  
activate and deactivate the network device.

13. A method of routing mobile IP packets, comprising:  
receiving the mobile IP packet within a forwarding element in a network device forwarding plane;  
looking up entries in a binding cache maintained in the forwarding element to determine whether an entry is specified in the binding cache for the mobile IP packet; and  
forwarding the mobile IP packet from the forwarding element to a destination corresponding to the entry in the binding cache.
14. The method according to Claim 13 wherein the mobile IP packet is further encapsulated prior to being forwarded to the destination.
15. The method according to Claim 13 further comprising routing the mobile IP packet from the network device forwarding plane to a network device control plane.
16. The method according to Claim 15 wherein the network device control plane verifies the mobile IP packet.
17. The method according to Claim 16 wherein the network device control plane further causes a binding entry corresponding to the mobile IP packet to be entered into the binding cache.

18. The method according to Claim 13 wherein the mobile IP packet is encapsulated when it arrives at the network device forwarding plane and the destination is a destination of an inner portion of the mobile IP packet.
19. The method according to Claim 18 wherein the mobile IP packet is further decapsulated in the network device forwarding plane and forwarded from the forwarding element to the destination.
20. The method according to Claim 19 wherein the mobile IP packet is further encapsulated prior to being forwarded from the forwarding element to the destination.
21. An article comprising a machine-accessible medium having stored thereon instructions that, when executed by a machine, cause the machine to:
  - receive a mobile IP packet within a forwarding element in a network device forwarding plane;
  - look up entries in a binding cache maintained in the forwarding element to determine whether an entry is specified in the binding cache for the mobile IP packet; and
  - forward the mobile IP packet from the forwarding element to a destination corresponding to the entry in the binding cache.
22. The article according to Claim 21 wherein the instructions, when executed by the machine, further cause the mobile IP packet to be encapsulated prior to being forwarded to the destination.
23. The article according to Claim 21 wherein the instructions, when executed by the machine, further cause the mobile IP packet to be routed from the network device forwarding plane to a network device control plane.

24. The article according to Claim 23 wherein the instructions, when executed by the machine, further cause the network device control plane to verify the mobile IP packet.
25. The article according to Claim 24 wherein the instructions, when executed by the machine, further cause a binding entry corresponding to the mobile IP packet to be entered into the binding cache.
26. The article according to Claim 21 wherein the mobile IP packet is encapsulated when it arrives at the network device forwarding plane and the destination is a destination of an inner portion of the mobile IP packet.
27. The article according to Claim 26 wherein the instructions, when executed by the machine, further cause the mobile IP packet to be decapsulated in the network device forwarding plane and forwarded from the forwarding element to the destination.
28. The article according to Claim 27 wherein the instructions, when executed by the machine, further cause the mobile IP packet to be encapsulated prior to being forwarded from the forwarding element to the destination.